

WHAT IS CLAIMED IS:

1 A wavelength monitoring apparatus comprising:

an optical device made of a periodic multilayer structure;

5 a beam source optically coupled to at least one end surface  
of said periodic multilayer structure, said one end surface being  
not parallel to layer surfaces of said periodic multilayer  
structure; and

10 beam detecting means for detecting beam made to exit from  
at least one surface of said periodic multilayer structure at  
a specific angle with respect to a specific wavelength, said  
one surface being parallel to said layer surfaces of said periodic  
multilayer structure.

15 2. A wavelength monitoring apparatus according to claim  
1, wherein said optical device is made of a multilayer film formed  
on a substrate transparent to the wavelength used.

3. A wavelength monitoring apparatus according to claim  
1, wherein said optical device is made of the periodic multilayer  
structure having layer surfaces perpendicular to a surface of  
a substrate.

20 4. A wavelength monitoring apparatus according to claim  
1, wherein said beam source is constituted by a semiconductor  
laser.

25 5. A wavelength monitoring apparatus according to claim  
1, wherein said beam detecting means is constituted by at least  
one photo detector.

6. A wavelength monitoring apparatus according to claim 2, wherein said optical device, a semiconductor laser and a photo detector are mounted on one and the same substrate.

7. A wavelength monitoring apparatus according to claim 6, wherein beam emitted from said semiconductor laser is coupled to a beam incidence end surface of said multilayer film by level differences provided on said substrate on which said multilayer film is formed.

8. A wavelength monitoring apparatus according to claim 6, wherein said photo detector is provided on a surface opposite to said surface of said substrate on which said multilayer film is formed.

9. A wavelength monitoring apparatus according to claim 3, wherein said optical device, a semiconductor laser and a photo detector are mounted on one and the same substrate.

10. A wavelength monitoring apparatus comprising:

an optical device having a periodic multilayer structure, said periodic multilayer structure defining, at least, a first surface substantially perpendicular to layer surfaces of the periodic multilayer structure and a second surface substantially parallel to the layer surfaces of the periodic multilayer structure;

a semiconductor laser confronted with said first surface;

and

a photo detector confronted with said second surface.

11. A wave length monitoring apparatus according to claim 10, further comprising:

a common substrate supporting said optical device, said semiconductor laser and said photo detector.

5 12. A wave length monitoring apparatus according to claim 11, wherein said substrate is transparent, and is contacted with the second surface of said periodic multilayer structure.

10 13. A wave length monitoring apparatus according to claim 11, wherein said substrate is contacted with a surface of said periodic multilayer structure other than said first and second surfaces.